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JEFFERSON COUNTY REMEDIAL ACTION LANDS

ANNUAL REPORT

JANUARY, 1991

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INTRODUCTION

This report summarizes the current status and land management activities planned for 1991 on Jefferson County remediation land. The March 1990 report proposed a program of remedial actions for the 1990 growing season but those activities were not carried out, for the most part, due to personnel changes at Rocky Flats Plant (RFP). RFP is concerned about this break in activities and has assigned a full time manager to the offsite areas with specific interest in revegetation. Michael Guillaume of EG&G is the manager of the offsite areas and can be reached at the plant site at 966-4291. With the specific goal of revegetation, the actions proposed for 1991 are similar to the 1990 proposal except for a change in amount of land area requiring revegetation work. Due to the successful growing season in 1990, the area requiring new seeding is 40% smaller.

The goals of the remediation program are:

1) Reduce the surface plutonium concentrations to below the Colorado Department of Health (CDH) plutonium-in-soil construction standard of 0.9 pCi/g by tilling the soil; and
2) Revegetate the resulting disturbed soil to stabilize with a perennial, self-sustaining grass cover.

Soil samples were taken from the tilled and untilled strips in January 1991. The CDH Radiation Control Division was consulted on the soil sampling methodology. The soil samples will be analyzed for plutonium and americium. The previous soil samples taken in 1986 and 1987 do not follow current quality assurance protocols, thus new samples to confirm the reduction of soil plutonium by tilling are needed. A significant change in the analysis results from the earlier data is not expected. The lab results will be sent to Jefferson County as soon as they are available.

CURRENT LAND STATUS

RFP has monitored the Jefferson County remediation land since the 1988 seeding activity. Data from 1989 and 1990 show the remedial action lands were protected from wind and water erosion by a fair-to-good vegetative ground cover. Figure 1 presents a photograph taken October 1990 comparing the native vegetation with the remediated vegetation. The percentage of grass versus weed cover is highly variable on the site. Some areas are completely dominated by seeded grasses and others are completely dominated by weeds. The vegetation shown in Figure 1 is representative of the cover. The vegetative ground cover is sufficient to stabilize the soil and minimize soil erosion. Gary Finstad of the Soil Conservation Service concluded the area of successful revegetation increased significantly during the 1990 growing season. The intended result of the 1991 land management program is to increase the area and productivity of perennial grasses and diminish competition from weedy species.

The objective of revegetation is to speed natural processes of vegetation establishment by encouraging desirable permanent plant species and discouraging weedy species. By the natural

process of revegetation, weedy species are generally the first plants to invade disturbed sites. As the weeds modify the immediate environment they allow other more permanent plants to invade and replace the weeds. The disturbed site thus evolves over time into a self-sustaining plant community. Weeds are not a dependable plant cover as many are annuals and highly dependent on precipitation.

The increase in revegetated species may be explained by the above average spring rainfall that was received in 1990. The Boulder station of the National Oceanic and Atmospheric Administration reported 4.4 inches of moisture in March 1990 compared with an average of 1.8 inches during March 1987-89.

Along with the overall increase in perennial plant cover, each species in the seed mix is found on the remediation lands. Increasing the number of individual species generally enhances the stability of a plant community.

The prairie dog population continues to interfere with plant growth on the tilled strips as well as the untilled native grass strips. In addition to grazing, the prairie dogs remove standing vegetation from around their burrows for a line-of-site protection from predators. The population seems to be increasing on the remediation lands as well as other adjacent areas.

A successful revegetation program on the Jefferson County remediation lands must consider the following factors:

1) Precipitation during seedling establishment has been sporadic. Precipitation records show inconsistent moisture in years prior to 1990. A mature plant community can adjust to periods of low moisture but new seedlings require consistent moisture until they become established
2) Sufficient time to evaluate revegetation success has not been used in the past. The growth pattern of many seeded plant species, particularly the native species, does not produce a visibly significant plant growth for several years. Plants adapted to dry environments produce extensive below ground plant mass with limited above ground production when very young. This growth pattern results in maximum moisture collecting ability through the roots while minimizing moisture loss through leaf surfaces. After securing a dependable moisture supply, the plant increases above ground production. Measuring revegetation success after only two years may not allow sufficient time for effective evaluation
3) Figure 2 presents a photograph taken during 1986 showing the extent of rocks brought to the surface during the initial tilling operation. Tilling brings many rocks to the surface which now interfere with the revegetation effort. The seed drill cannot operate properly in rocky soil. The intimate contact required between seed and soil cannot be made without the presence of fine soil particles. Without contact with the soil, the seeds will not maintain adequate moisture for germination and early growth.
4) Prairie dog activities degrade the vegetation on the site. The prairie dogs graze the new emerging seedlings and mow surrounding plants to maintain a visual defense against predators. Even the tough Spanish Bayonet cactus (Yucca glauca) is not immune to their mowing
5) Revegetation success is often related to topography. Topography effects evaporation rates and thus available water for plant growth. Warmer south facing slopes tend to have higher evaporation rates which deplete soil water more quickly. Successfully revegetated areas at the site more often occur on nearly level to north-facing slopes

while the less successful revegetation areas are more often on south-facing slopes.

6) Weeds dominate many areas on the site. Weeds are very effective competitors for water and nutrients to the detriment of more desirable species. Weed species currently provide much of the ground cover important to soil protection but more desirable grass species are needed for long term soil stability.

1991 LAND MANAGEMENT PROGRAM

The overall objective of remediation is to reduce plutonium concentration to below 0.9 pCi/g by mixing the surface soil through tilling. The resulting disturbed soil is then revegetated to stabilize the land surface and minimize resuspension. Tilling the the alternate strips will not occur until the initial strips are successfully revegetated as directed by the Settlement Agreement.

The objective of the 1991 land management plan is to minimize soil resuspension while increasing revegetation success. The most plausible health risk from the lands is due to inhalation of resuspended plutonium contaminated soil. Therefore reducing soil resuspension minimizes the potential health risk from inhalation. This section of the annual report first discusses weed management, prairie dog suppression and changing the grass seed mix, issues that effect all the remediation lands. Secondly the management program outlines specific management units requiring more intensive activities.

WEED MANAGEMENT PROGRAM: An ideal weed management program would utilize both mechanical mowing of weeds and herbicide applications. Currently no herbicides are being used at RFP due to the possibility for surface water contamination. This policy needs reevaluation considering the requirements of revegetation on the remedial action lands. Rocky Flats hopes to resolve this issue and allow herbicide use on the action lands before the 1991 growing season. A weed management program that provides for timely weed management will be developed for the entire growing season. Mowing operations and perhaps herbicide applications should be conducted at appropriate times during the growing season, based on the growth stages of the target weed species.

PRAIRIE DOG SUPPRESSION: Prairie dogs currently impact the remedial action lands to the detriment of the revegetation effort. Control methods such as chemical annihilation to passively discouraging expansion are technically feasible, the various options are being investigated. Jefferson County Open Space manages land areas adjacent to the remedial action lands with large prairie dog populations. A prairie dog control policy compatible with Open Space policy should be pursued before the upcoming season.

GRASS SEED MIX CHANGE: The performance of the grass seed mix used in 1986 and 1988 can be improved with the addition of Blue grama. Blue grama makes up a large percentage of the native vegetation and its strong drought resistance provides soil stability during poor moisture years. As the revegetation effort is evaluated each year, changes to the seed mix will occur with increased knowledge. The following table presents the proposed changes to the seed mix.

Grass seed mix proposed for 1991.

Species	Variety	Percent of mix old	Percent of mix new
Western wheatgrass (Agropyron smithii)	Arriba	40	40
Sideoats grama (Bouteloua curtipendula)	Vaughn	40	25
Blue grama (Bouteloua gracilis)		0	15
Pubescent wheatgrass (Agropyron trichophorum)	Luna	10	10
Smooth brome (Bromus inermis)	Lincoln	10	10

MANAGEMENT UNITS: This management plan divides the lands into management units based upon current revegetation success as reported by Gary Finstad of the Soil Conservation Service (letter 10/15/90). This division considers the similarity of the cultural requirements of seedbed preparation, seeding and mulching.

Management Units:

#1) 50% of the land considered successfully revegetated

#2) 10-15% of the land considered marginal

#3) Failure areas covered by rocks

#4) Failure areas not covered by rocks.

Management Unit #1: These areas contain sufficient ground cover of perennial grasses to insure stability of the soil from wind and water erosion. Areas considered successfully revegetated will be managed for weed control and prairie dog suppression. Enhancement of existing perennial vegetation will be the goal.

Management Unit #2: These areas contain grasses but not in sufficient density to insure soil stabilization. A weed management program will be initiated in the spring and continue through the summer and fall. During late fall, this area will be seeded with the grass seed mixture using a rangeland drill. The rangeland drill will seed through the existing vegetative cover into the soil. No seedbed preparation will be needed prior to seeding. After seeding, areas requiring additional cover will be mulched with straw. The straw will be held in place by crimping or applying a tackifying agent.

Management Unit #3: Units 3 and 4 failed to establish any seeded grass species. Unit 3 is covered by rocks brought to the surface during the initial tilling operations of 1986 (see Figure 2). The surface rocks prevent the seed drill from placing seed in contact with soil necessary for sustained growth. These areas are not subject to wind or water erosion nor likely

to support sizable amounts of vegetative cover. A weed management program will be started in the spring and grass seeding will be done in the fall. As drill seeding is not practical, hydroseeding techniques will be used followed by a straw or hydroseed mulch.

Management Unit #4: Unit 4 contains areas that failed to establish vegetation for reasons other than rocky surface soils (see page 2). These areas are potentially the most difficult to revegetate. A weed management program will start in the spring followed by seeding a cover crop of forage sorghum. During late fall, interseeding of the grass seed mix will occur within the standing sorghum. If the sorghum cover does not supply sufficient protection, a mulch will be applied.

1991 CHRONOLOGY

The following sequence of events are planned for the upcoming year.

Winter -Determine offsite herbicide policy with CDH
-Meet with Open Space personnel on Prairie dog control
-contract for weed control and revegetation activities

Spring -Implement area wide weed response program and prairie dog controls
-Seed sorghum in Management. Unit #4

Summer -Maintain weed response program
-Monitor and evaluate land management plan

Fall -Maintain weed management program
-Drill seed with grass seed mix and mulch in Management. Unit #2 and #4
-Hydroseed and mulch in Management. Unit #3
-Evaluate overall land management plan

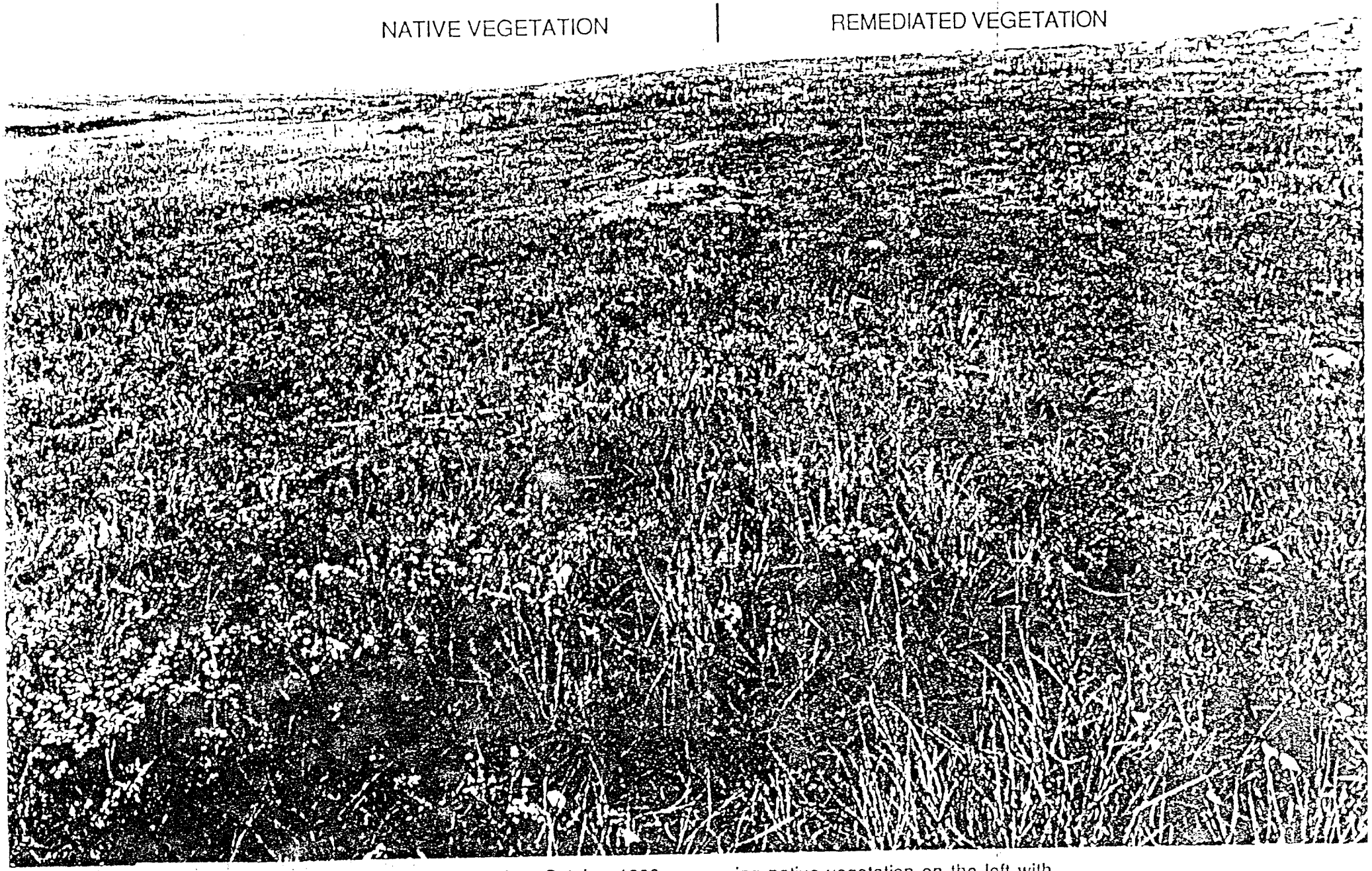

Figure 1. Photograph taken October 1990, comparing native vegetation on the left with remediated vegetation on the right.

Figure 2. Photograph taken spring 1986, showing [redacted] rocks brought to the surface during initial tilling operations.